

CLAIMS

- Sub 7
HVE,
1. A method for marking materials using a material to be marked and a marking material consisting of a transparent body or a laser transmittive body, comprising;
- a first process of placing the surface of said material to be marked and the surface of said marking material together with a desired gap therebetween, vaporizing said marking material by irradiating it through said material to be marked with a beam of a first laser power while scanning with the laser beam, and depositing a deposit vaporized from said marking material to a predetermined portion of said material to be marked; and
- a second process of removing or denaturalizing said deposit deposited to the surface of said material to be marked with a laser beam of a second laser power; whereby
- patterns of characters, diagrams or symbols are formed on said material to be marked.

2. The method for marking materials according to claim 1, wherein the laser power of said first laser power is greater per unit area than the laser power of said second laser power.

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3. The method for marking materials according to claim

1, wherein said deposit is subject to direct irradiation
in said second process without passing said laser beam
through said material to be marked.

4. The method for marking materials according to claim
1, wherein the deposit caused to degenerate by irradiation
by said second laser power is changed in color or to made
transparent by heating.

5. A method for marking materials in which the material
to be marked and the marking material consist of a
transparent body or a laser transmittive body, comprising
the process of:

forming patterns of characters, diagrams or symbols
on said material to be marked by placing the surface of
said material to be marked and the surface of said marking
material together with a desired gap therebetween;

vaporizing said marking material by irradiating it
through said material to be marked with a laser beam while
scanning with the beam; and

depositing a deposit vaporized from said marking
material to a predetermined portion of the material to be
marked; whereby

said patterns of characters, diagrams or symbols are
formed by reacting the gas existing in said gap with the

vaporized marking material due to the evaporation of said marking material by said laser beam and the reaction product deposited to the desired portion of the material to be marked.

6. The method for marking materials according to claim 5, wherein the gas existing in said gap is one of either oxygen or nitrogen or both.

7. The method for marking materials according to either claim 1 or claim 5, wherein said gap is 2 μ m or more and less than 200 μ m.

8. A method for marking materials using a material to be marked and a marking material consisting of a transparent body or a laser transmittive body comprising the process of forming patterns of characters, diagrams or symbols by placing together the surface of said material to be marked with the surface of said marking material with a desired gap therebetween, vaporizing said marking material by irradiating it through said material to be marked while scanning with a laser beam and depositing a deposit formed from said marking material to a predetermined portion of said material to be marked, whereby

said patterns of characters, diagrams or symbols are formed by changing the transmittivity or reflectivity of the deposit formed from the marking material by laser beam irradiation.

Sub 7
9. A marking material for use in any one of claims 1, 5 and 8, wherein the marking material used is a metal, an alloy, an intermetallic or metal compound, or a compound containing at least one of said metal, alloy and intermetallic or metal compound.

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Sub E2
10. The marking material of claim 9 wherein the thin film formed on the surface of the transparent body or laser transmittive body is of a thickness of 10 μ m or less and preferably from 0.1 μ m to 2 μ m.

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11. A marking material for use in either claim 1 or 5 wherein the marking material is steel or stainless steel.

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12. A marking material for use in claim 1 or 5 wherein the marking material is either a martensite or a ferrite stainless steel, or low carbon steel, and preferably steel with a carbon content of 0.25 % or less.

13. The marking material according to claim 11 or 12,

wherein the marking material is a thin film formed on the surface of a transparent body or laser transmittive body.

14. The marking material according to claim 13, wherein thickness of said thin film is 10 μ m or less, and preferably from 0.1 μ m to 2.0 μ m.

15. The marking material according to any one of claims 9 to 14, wherein the pattern formed is QR Code, Data Code, Veri Code, a two-dimensional code, or a bar code.